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Provide a Vessel to Conduct Observations and Deploy Sound Source and a Vessel for Passive Acoustic Monitoring for a Behavioral Response Study of Cetaceans off Southern California in 2012

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LONG-TERM GOALS

The long term goal of the SOCAL Behavioral Response Study is to determine how cetaceans respond to naval sounds, specifically mid-frequency sonar, to better evaluate impacts and develop strategies for mitigation. The field season in 2012 was the third year of this proposed multi-year study. The goal of this specific grant was to provide a vessel to serve as an observational platform and as a base of operations for a sound source and also support for chartering a vessel for use of a towed array to be used in the Behavioral Response Study conducted off Southern California in summer and fall 2012. Other components of this work were included in other separate grants to the various groups involved in the collaborative study and this report addresses just the vessels to serve as a base of operations and the primary platform for the observation and sound source and a vessel for operation of a towed acoustic array.

OBJECTIVES

This grant provided essential support for the SOCAL-BRS operations in summer and fall 2012. This was the third year of the proposed multi-year SOCAL Behavioral Response Study for southern California which began in 2010 to examine the impacts of anthropogenic sounds on local marine mammal species and represents a collaborative effort among a number of parties including Cascadia, Southall Environmental Associates, Woods Hole Oceanographic Institute (WHOI), Southwest Fisheries Science Center (SWFSC), University of St. Andrews (SA), Naval Undersea Warfare Center (NUWC). Overall objectives of the SOCAL BRS are to obtain new data on the response of a variety of species of marine mammals to Navy sonar to aid the Navy and NOAA in assessing the impact of these activities and ways they might be mitigated.

APPROACH

The approach of the SOCAL-BRS involved a multi-disciplinary collaboration supported by ONR and N45, this report is for the grant that funded primary vessel support the projects field effort in 2012. This encompassed two charters as described below.

Report Documentation Page

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A larger vessel for two 14-day periods to serve the following:

1. Visual observations to sight target and non-target species and monitor behavior during the planned two legs of experimental operations in July to October 2012
2. A platform from which to operate a sound source for use in the BRS playbacks in 2012,.
3. Serve as a base of operations for small boat operations to sight animals and deploy tags as well as conduct photo-ID in 2012
4. Provide housing and food for up to 15 personnel participating in the BRS during the two experimental legs planned for SOCAL-12.

Support for a second vessel for one of these 14-day periods for the following:

1. A platforms for operation of Passive Acoustic Monitoring (PAM) to be operated by Southwest Fisheries Science Center.
2. To provide an experienced visually observer to operated from the PAM vessel.

The field effort was conducted in 2012 and involved the charter of the vessel *Truth* (Figure 1) out of Santa Barbara, California as the base of operations and the sailboat *Derreck M Baylis* (Figure 2) as the PAM vessel. Goals during 2012 included:

- Expend the sample size of deployments and playbacks obtained in 2010-11 with additional deployments and playbacks on target species in 2012 with more of a focus on offshore species especially beaked whales and Risso's dolphins..
- Improve on the passive acoustic monitoring conducted in 2011 with a larger more mobile platform for conducting the towed array to improve detection, deployment, and tracking of beaked whales in areas other than the San Clement SOAR range (towed array was operated by SWFSC).

This primary vessel (*Truth)* was chosen to be used again in 2012 because it had proved and ideal and cost-effective platform in 2010 and 201 including meeting the following requirements:

- Area of operations to extend from Moro Bay to San Diego and offshore to include waters west of San Clemente and around San Nicolas and Catalina Islands
- Cruising speed of at least 10 knots and range of 400 nmi of more.
- Operations generally involve daylight ops (12 hours) but transits occurring at night as needed to either return to a sheltered area or harbor or shift to a new area. Occasional night operations tracking a tagged whale.
- Most overnights will be spent either in harbor, anchored, or drifting with up to half the nights underway most of the night either transiting or tracking a whale.
- Fuel usage averaging 200 gal/day (adequate for average of 100 nmi per day travel) included in charter with additional fuel charged as a surcharge.

- Ability to put 3 observers on top of wheelhouse with unobstructed visibility forward and to the sides with a 3-4 foot railing added for safety with canvas to provide wind break on railing and intercom or other means of easy communication with bridge and sundeck area behind bridge.
- Carry at least 150 gallons of gasoline (in bladders, drums, or fuel caddies) in a location that allows refueling RHIBs at night while at anchor or at dock (gasoline itself will be paid for by research group)
- Provide adequate bunks for 15 personnel plus crew.
- Provide adequate food and cook to feed number of people specified above including accommodating special dietary needs.

Figure 1. Vessel Truth chartered under this grant for leg 1 and 2 of the SOCAL-12 BRS showing scientific crew and RHIBs used for tag deployments.

Figure 2. Sailboat Derreck M Baylis charterd for Leg 1 of the SOCAL-12 BRS showing visual observers and towed PAM operated by SWFSC.

WORK COMPLETED

The work under this grant was primarily conducted in 2012. Support for *Truth* in Leg 1 and Leg 2 of 2012 as well as the PAM sailboat came from this grant and was compleed as follows:

- Leg 1 involving the *Truth*, two RHIBs, and passive acoustic monitoring (PAM) from the sailboat *Derreck M Baylis* from 26 July to 8 August 2012
- Leg 2 involving the *Truth* and two RHIBs (with PAM from *Truth*) 12-25 October 2012

Vessels chartered under this grant performed well during the BRS effort in 2012 and overall the BRS continues to be extremely successful. The platform *Truth* chartered under this grant met all the requirements and was an outstanding platform that helped make the cruise as successful as it was. I allowed the BRS to be conducted over wide-ranging areas with a flexible itinerary to best take advantage of weather openings and encounters with different species.

The *Baylis* as a platform for the PAM work (conducted by SWFSC) on Leg 1 represented a major improvement over the vessels used in 2010 and 2011. The vessel was larger and more capable and with two captains was able to operate longer hours typically heading out to the study area ahead of the other vessels to begin the search for beaked whales. During operations in the Catalina Basin, this platform was able to repeatedly locate areas of beaked whale activity which allowed us to focus efforts in that area. It lead to the successful finding and tracking of a Cuvier's beaked whale group and the short-term deployment of several tags. This achieved one of the main goals of the PAM effort.

While results of the observations, tag deployments, and playbacks completed will be more appropriately covered under reports for other components of the overall BRS project but some of the key accomplishments of the work completed are briefly summarized in the Results.

RESULTS

Results and accomplishments of the SOCAL-BRS including the 2012 field work supported under this grant have exceeded expectations and provided new information on the response of a number of species to playback of mid-frequency sonar sounds. This grant representing just one component of a larger collaborative effort and results of the Behavioral Response Study are the focus of continuing analysis under other grants that are part of the SOCAL-BRS. From the 2012 field effort, 26 tags of four types were deployed on 20 individuals of nine species. In 2012, six playbacks were conducted on 8 focal animals of six species. This included the first deployment of a suction cup archival tag and first playback on a Barid's beaked whales representing a key accomplishment of this work (Figure 3). Presentations on the findings of the BRS to date have been made to a number of groups including before the new Navy Living Marine Resources Review and the Biennial Conference on the Biology of Marine Mammals. A publication on this success of the approach we developed has been published recently in the Marine Technology Society Journal (Southall et al. 2012) and numerous other publications have been prepared and in different stages of review/submission.

Figure 3. RHIB approaching group of Baird's beaked whales and succseesful deployment of a Dtag and playback on 1 August 2012.

IMPACT/APPLICATIONS

SOCAL-12 effort demonstrated a successful model for conducting BRS studies and showed that both the BRS team, the region, and the methods employed were ideal and achieved a much higher level of

success than had been anticipated. The study promises to provide important new data on the behavioral response of cetaceans to Navy sonar and other sounds.

TRANSITIONS

Work will be continuing on ths anticipated multi-year project. Enough data was gathered from 2010 to 2012 to allow analysis and presentation of some of the findings to scientific conferences including the Biennial Conference on the Biology of Marine Mammals in Tampa in November and December 2011 and several publications already completed or in difference stages of review/submission.

RELATED PROJECTS

This specific grant was to provide vessels to serve as an observational platform and as a base of operations for a sound source to be used in the SOCL-12 Behavioral Response Study conducted off Southern California in summer and fall 2012. Other components of this work were included in other separate grants to the various groups including Cascadia Research, Southall Environmental Associates, Woods Hole Oceanographic Institute (WHOI), Southwest Fisheries Science Center (SWFSC), University of St. Andrews (SA), and Naval Undersea Warfare Center (NUWC).